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(54) SYRINGE WITH PROTECTIVE HOUSING

SPRITZE MIT SCHUTZGEHÄUSE

SERINGUE A CAPUCHON PROTECTEUR

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Description

This invention relates to syringes of the kind having a main body portion and a protrusion extending therefrom to mate with the hub of a needle.

Different devices are available for protecting a user, or others, from the sharp end of an exposed needle. In US-A-4872552 there is described a needle with a protective housing hinged to its hub. In EP-A-0469736 (published after the priority date of the present application) there is described a protective housing hinged to an adaptor located between the needle hub and syringe. Such protective devices safeguard the user, and bystanders, from being inadvertently punctured by contaminated needles and thereby risking contracting contagious diseases that may be carried by the contaminated needles. Although these help protect the tip of the needle after use, the needle can still be removed from the syringe after use, allowing possible contamination from material in the exposed hub end of the needle or in the syringe.

To ensure a high degree of safety, it has been well recognized that no contact be made with a contaminated needle, after the same has been withdrawn from a patient. Yet with conventional syringes, a contaminated needle has to be first recapped, and then removed from the syringe before it can be disposed of. During the process of recapping and removing the contaminated needle from the syringe, there is always the possibility that a user, or others, may be accidentally pricked by the contaminated needle.

It is an object of the present invention to alleviate the problems with previous arrangements.

According to the present invention there is provided a syringe of the above-specified kind, characterised in that the syringe has a housing flexibly and irremovably connected to the main body portion, the housing being pivotable toward a position in substantial alignment along the longitudinal axis of the needle for enveloping the needle, and that the housing includes a lock for substantially fixedly retaining the needle within the housing once the housing has been pivoted to alignment position.

The syringe preferably includes a shoulder member extending longitudinally from the main body portion to connect with the housing. The housing may be integrally and flexibly connected to the main body portion via a hinge, the housing comprising a longitudinal sheath having an elongate slot through which the needle passes when the sheath is pivoted to alignment position. The lock preferably comprises at least one hook integral with the housing for substantially preventing relative movement between the needle and the housing. The syringe may have an integrally-threaded collar extending from the main body portion to surround at least a part of the protrusion. The housing may comprise a main section, a cap section, a collapsible section interposed between and connecting the main and cap section, and a seal within the cap section that sealingly secures the tip of the needle after the housing has been pivoted to alignment position and the main and cap sections have been effectively urged toward each other to collapse the collapsible section to thereby cause the tip of the needle to penetrate into the seal.

Alternatively the housing may be flexibly connected to the main body portion via a collapsible hinge, the housing including a cap section including a seal that sealingly secures the tip of the needle after the housing has been pivoted to alignment position and effectively urged toward the syringe along the longidudinal axis of the needle to collapse the collapsible hinge and cause the tip of the needle to penetrate into the seal.

An objective of the present invention is, therefore, to provide a one-piece disposable syringe that substantially reduces the potential risk of a user, or others, from inadvertently being pricked by a contaminated needle.

Another objective of the present invention is to provide a one-piece disposable syringe that has redundant safety features built in thereby doubly to ensure that the tip of a contaminated needle does not pose a risk to a user, or others.

The above-mentioned objectives and advantages of the present invention will become more apparent and the invention will best be understood by reference to the following description of embodiments of the present invention taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a side view of a first embodiment of the syringe of the present invention drawn in alignment with a needle assembly that is to be mated to the syringe;

Figure 2A is a plan view of the protective housing shown in the Fig. 1 embodiment;

Figure 2B is a cross-sectional cut-away view, along line A-A, of the Fig. 2A protective housing;

Figure 2C is a cross-sectional cut-away view, along line B-B, of the Fig. 2A protective housing;

Figure 3 is a second embodiment of the syringe of the present invention;

Figure 4 is yet another embodiment of the syringe of the present invention;

Figure 5A is a plan view of a variant of the Figure 2A protective housing;

Figure 5B is a cross-sectional view of the Figure 5A protective housing;

Figure 5C is a partial view of the Figure 5A variant housing whose collapsible section has been compressed;

Figure 6 is a side view of a variant of the Figure 1 embodiment whose protective housing has been replaced by the Figure 5A protective housing;

Figure 7 is a side view of a variant of the Figure 3 embodiment whose housing has been replaced by the Figure 5A protective housing;

Figure 8 is a variation of the Figure 4 embodiment whose housing has been replaced by the Figure 5A protective housing;

Figure 9 is another variation of the Figure 1 embodiment whose housing has adapted at its distal end section a sealing member and whose housing is connected to the syringe by a collapsible hinge;

Figure 10 is another variation of the Figure 3 embodiment whose housing has adapted at its distal end a sealing material and whose housing is connected to the syringe via a collapsible hinge; and

Figure 11 is another variation of the Figure 4 embodiment whose housing has adapted at its distal end a sealing material and whose housing is connected to the syringe by a collapsible living hinge.

DETAILED DESCRIPTION OF THE INVENTION

A first embodiment of the present invention comprising a liner slip type syringe 2 is shown in Fig. 1. As illustrated, syringe 2 has a main body portion 4 and a protrusion, or a male liner ejection end, 6 integrally extending from main body portion 4. Extending from main body portion 4 longitudinally along axis 8 is a shoulder member 10. At distal end 12 of shoulder member 10 there is connected, via a hinge means such as living hinge 14, a housing or sheath 16. It should be appreciated that the length of shoulder member 10 may vary, depending on the type and length of needle being used with the syringe, or the length and size of ejection end 6. In fact, shoulder member 10 does not necessarily have to be there, inasmuch as hinge 14 may be directly integrated to main body portion 4. Similarly, the length of housing 16 may vary, dependent on the length of cannula 18 of needle assembly 20, so as to be adaptable to any needle length.

To mate needle assembly 20 to syringe 2, needle hub 22 of needle assembly 20 is slip fitted over ejection end 6. As should be apparent, housing 16 had already been pivoted out of the way of cannula 18 along the direction indicated by arrow 24. After use (i.e., after cannula 18 has been withdrawn from the patient), housing 16 is pivoted along the direction indicated by arrow 26 to envelop cannula 18.

To substantially fixedly retain cannula 18 within housing 16 to thereby prevent relative movement between cannula 18 and housing 16, the locking mechanisms disclosed in aforenoted co-pending application Serial No.532,558, the disclosure of which is incorporated herein by reference, is used.

Briefly, with reference to Figs. 2A-2C, it can be seen that longitudinal housing 16 has an elongated slot 28 bounded by sides 30 and 32, running substantially in parallel along the length of housing 16, which has a tip 34 and a base 36. (For one-handed operation, a user would push the portion of housing 16 near tip 34 against a stationary object to pivot housing 16 into alignment with cannula 18.) Further shown on housing 16 are openings 38 and 40, at whose respective centers are integrally formed locking mechanisms 42 and 44. Locking mechanisms 42 and 44 each have a substantially rigid finger, respectively 42a and 44a.

Refer now to Fig. 2C and representative locking mechanism 42. As housing 16 is pivoted into alignment with cannula 18, cannula 18 is first biased against finger 42a. But as cannula 18 relatively moves past tip 42t of finger 42a, the previously biased finger 42a would spring back to its natural position to thereby retain cannula 18 within the space between finger 42a and extension 42b, and substantially prevent relative movement between cannula 18 and housing 16.

Fig. 2B is a cross-sectional view, along cut A-A of Fig. 2A, of housing 16 which shows that fingers 42a and 44a extend in opposite downwardly sloping directions. Such a construction makes it more difficult for a retained cannula from being forcibly removed from the housing.

A second embodiment of the present invention is illustrated in Fig. 3 where protective housing 16 is shown to be connected to a liner lock type syringe 50. Like the liner slip type syringe, liner lock type syringe 50 has a main body portion 52 and an ejection end 54. Furthermore, a collar 56 having internal threads 58 integrally extends from main body portion 52 to surround the lower portion of ejection end 54. For the Fig. 3 embodiment, needle assembly 20 (see Fig. 1) is mated to syringe 50 by threadedly mating extension 60 at the end of hub 22 with threads 58 of collar 56. Hub 22 naturally becomes mated with ejection end 54. Protective housing 16 is shown to be connected to collar 56 by a living hinge 60, whose length, as should be appreciated, can be varied depending on the length of the cannula of the needle assembly mated to syringe 50.

Another embodiment of the present invention is shown in Fig. 4. The only difference between the Fig. 3 and Fig. 4 embodiments is the interposing of a shoulder member 62, which extends integrally from main body portion 52 of syringe 50, between housing 16 and main body portion 52. As should be appreciated, the length of shoulder member 62 may be varied in accordance with need. Further, it should be appreciated that shoulder member 62 may actually be jointedly connected to an outer circumferential portion of collar 56.

In operation, each of the embodiments of the present invention is to be mated with a needle assembly, such as 20 shown in Fig. 1. In the case of the Fig. 1 embodiment, needle hub 22 is slip fittedly mated with ejection end 6 of syringe 2. For the case of syringe 50 shown in Figs. 3 and 4, extension 60 of needle hub 22 threadedly mates with the internal threads of collar 56 to join the needle assembly to the syringe. In any one of the embodiments, before use, housing 16 is pivoted in a direction as shown by arrow 24 (Fig. 1) away from cannula 18. After cannula 18 has been removed from a patient, housing 16 is pivoted along the direction indicated by arrow 26, via hinge 14 (or 60 for the Figs. 3 and 4 embodiments) into alignment with cannula 18. At which time at least one of locking mechanisms 42 and 44 would fixedly retain cannula 18 within housing 16 to prevent relative movement between cannula 18 and housing 16. Having thus enveloped and substantially fixedly retained cannula 18, the syringe may be disposed of.

With reference to Figs. 5A-5C, a variant of the Fig. 2A housing may also be used with the instant invention to further enhance the safety integrity of the present invention by ensuring that the tip of a contaminated needle (or cannula) is sealingly secured, and therefore not be exposed, even in highly unlikely circumstances where the protective housing may not properly retain the contaminated needle -- as for example when the housing is cracked or the locking mechanisms malfunctioned. For the Fig. 5A variant, elements which are similar, or perform similar functions, as those of the embodiments shown in Figs. 1-4 are labelled the same.

As illustrated in Fig. 5A, variant housing 16 has a substantially longitudinal collapsible (compressible or crushable) accordion-shaped section 70 interposed between and integrally connecting the main portion and a cap portion 74 of housing 16. For purposes of explanation, the main portion of housing 16 extends from base 36 to a partition 72 at the end of opening 38. If the housing is to be a one-piece molded sheath, manufactured for example from plastic, collapsible section 70 becomes an integral part of housing 16 by integrally extending from partition 72 to edge 78 of cap portion 74. Alternatively, collapsible section 70 may be made of materials different from that of housing 16, as for example foldable cardboard or fibered paper, as long as the main portion of housing 16 may be jointed to cap portion 74 by the collapsible section.

Although collapsible section 70 is shown to be accordion-shaped, it should be appreciated that differently shaped collapsible sections may also be used, so long as such sections are collapsible (compressible or crushable) to thereby enable the distance separating the main portion and cap portion 74 of housing 16 (or more accurately, the distance between partition 72 and edge 78) to be reduced as relative movement urging the main portion and cap portion 74 of housing 16 toward each other is effected.

As shown, adapted to and fitted within cap portion 74 is a sealing material 76 which may be, for example, a malleable elastomer, rubber or some other suitable material that can sealingly secure and firmly grip a sharp object, as for example tip 19 of needle 18, penetrating therein. Materials such as cork or wax may also be used. It should further be appreciated that tip 34 of cap portion 74 is made of a material such as hard plastic that is substantially impervious to penetration by sharp objects such as, for example, tip 19 of needle 18. As has been pointed out previously, the length of housing 16, which extends from base 36 to tip 34, may vary to accommodate various lengths of needle 18, and is such that a clearance is provided in the space within collapsible portion 70 to allow a needle of any given length to pass unobstructed through opening 28, when housing 16 is pivoted to substantially align and envelop needle 18.

Assume that housing 16 has been pivoted into alignment with the longitudinal axis of needle 18 and that needle 18 has in turn been retained by at least one of locking mechanisms 44 and 42. As best shown in Fig. 5C, when relative movement for urging cap portion 74 toward the main portion of housing 16 is effected, collapsible section 70 would collapse (or be compressed) to reduce the distance separating partition 72 and edge 78, and thereby effectively cause sealing material 76 to move toward tip 19 of needle 18 and be penetrated thereby. Once having been penetrated, sealing material 76 substantially and sealingly secures tip 19 of needle 18. The relative movement between the main portion of housing 16 and cap portion 74 may be effected by a single-handed operation of pushing tip 34 of housing 16 against some immobile object. Fig. 5B provides for a side view of the Fig. 5A variant protective housing.

Figs. 6, 7 and 8 respectively show the corresponding housings of the embodiments of Figs. 1, 3 and 4 to have been substituted for by the Fig. 5A variant protective housing. Thus, each of the alternative embodiments of Figs. 6, 7 and 8 provides the additional safety feature of sealingly securing the tip of a contaminated needle. This is achieved, of course, by cap portion 74 being urged against tip 19 of needle 18, after variant housing 16 has been pivoted into alignment position with the contaminated needle, such that the tip of the needle pierces and penetrates into sealing material 76, which is adapted within cap portion 74, and be sealingly secured thereby.

Instead of a housing having a main portion jointed to cap portion 74 by a collapsible section, an alternative embodiment for securely retaining the tip of a contaminated needle may be had with reference to Figs. 9, 10 and 11. Again, components in Figs. 9, 10 and 11 which are similar to, or perform similar functions as, those discussed earlier are labeled the same.

With particular reference to Fig. 9, which is a variant of the Fig. 1 embodiment, it can be seen that housing 16, which is a unitary piece, is flexibly connected to distal end 12 of shoulder member 10 by a collapsible hinge means such as living hinge 80. Housing 18 has a cap portion 74 within which a sealing material 76 is adaptedly fitted.

As should be readily appreciated, after housing 16 has been pivoted into alignment position along the longitudinal axis of needle 18, a relative movement may be effected to urge housing 16 and syringe 2 toward each other so that collapsible hinge 80 would collapse (or be compressed), to thereby cause tip 19 of needle 18 to pierce and penetrate into sealing material 76 and be sealingly gripped thereby. As should further be appreciated, it is not necessary that shoulder member 10 be present for the Fig. 9 embodiment, as collapsible hinge 80 may be directly connected to syringe 2.

In Fig. 10, housing 16 is shown to be directly connected to collar 56 of luer lock type syringe 50. Do note, however, that the length of collapsible living hinge 80 may vary, and that housing 16 may be connected, via collapsible hinge 80, directly to main body portion 52 of syringe 50.

The variant embodiment of the present invention syringe illustrated in Fig. 11 shows that housing 16 is connected to syringe 50 at distal end 12 of extending

shoulder member 62. Of course, the length of shoulder member 62 may be varied in accordance with need. Or, for that matter, collapsible hinge 80 can directly connect housing 16 to syringe 50, thereby bypassing shoulder member 62 altogether. Further, the operation of the variant embodiments shown in Figs. 9, 10 and 11 is the same in that each requires that housing 16 be pivoted into alignment position with needle 18, which is then substantially retained by at least one of locking mechanisms 42 and 44. And by relatively moving housing 16 and main body portion 52 of syringe 50 toward each other (as for example by urging tip 34 of housing 16 against some immobile object), collapsible hinge 80 would collapse (be compressed or crushed) so that tip 19 of needle 18 is caused to pierce and penetrate into sealing material 76 and be sealingly retained thereby.

With the embodiments illustrated in Figs. 6-11, the safety integrity of the syringe of the instant invention is further enhanced in that, in addition to having the contaminated needle substantially permanently retained within a protective housing, the tip of the contaminated needle is also substantially sealingly secured within a sealing material.

Inasmuch as the present invention is subject to many variations, modifications and changes in detail, it is intended that all matter described throughout this specification and shown in the accompanying drawings be interpreted as illustrative only and not in a limiting sense. Accordingly, it is intended that the invention be limited only by the appended claims.

Claims

1. A syringe (2) having a main body portion (4) and a protrusion (6) extending therefrom to mate with a hub (22) of a needle (20), characterised in that the syringe (2) has a housing (16) flexibly and irremovably connected to the main body portion (4), that the housing is pivotable toward a position in substantial alignment along the longitudinal axis of the needle (20) for enveloping the needle, and that the housing (16) includes a lock (42, 44) for substantially fixedly retaining the needle (20) within the housing (16) once the housing has been pivoted to alignment position.

2. A syringe according to Claim 1, characterised in that the syringe (2) includes a shoulder member (10) extending longitudinally from the main body portion (4) to connect with the housing (16).

3. A syringe according to Claim 1 or 2, characterised in that the housing (16) is integrally and flexibly connected to the main body portion (4) via a hinge (14).

4. A syringe according to any one of the preceding claims, characterised in that the housing (16) comprises a longitudinal sheath having an elongated slot (28) through which the needle (20) passes when the sheath is pivoted to alignment position.

5. A syringe according to any one of the preceding claims, characterised in that lock comprises at least one hook (42, 44) integral with the housing (16) for substantially preventing relative movement between the needle (20) and the housing (16).

6. A syringe (2) according to any one of the preceding claims, characterised in that the syringe has an internally-threaded collar (56) extending from the main body portion (4) to surround at least a part of the protrusion (6).

7. A syringe according to any one of the preceding claims, characterised in that the housing (16) comprises a main section, a cap section (74), a collapsible section (70) interposed between and connecting the main and cap sections, and a seal (76) within the cap section (74) that sealingly secures the tip (19) of the needle (20) after the housing (16) has been pivoted to alignment position and the main and cap sections (74) have been effectively urged toward each other to collapse the collapsible section (70) to thereby cause the tip (19) of the needle (20) to penetrate into the seal (76).

8. A syringe according to any one of Claims 1 to 6, characterised in that the housing (16) is flexibly connected to the main body portion (4) via a collapsible hinge (80), and that the housing (16) includes a cap section (74) including a seal (76) that sealingly secures the tip (19) of the needle (20) after the housing (16) has been pivoted to alignment position and effectively urged toward the syringe (2) along the longidudinal axis of the needle (20) to collapse the collapsible hinge (80) and cause the tip (19) of the needle (20) to penetrate into the seal.

Patentansprüche

1. Spritze (2) mit einem Hauptkörperbereich (4) und einer davon ausgehenden Hervorstehung (6) zur Aufnahme des Konus (22) einer Kanüle (20), dadurch gekennzeichnet, daß die Spritze (2) ein flexibles Gehäuse (16) aufweist, welches nicht entfernbar mit dem Hauptkörperbereich (4) verbunden ist, das Gehäuse in eine im wesentlichen mit der Längsachse der Kanüle (20) ausgerichtete Stellung schwenkbar ist, in welcher die Kanüle umschlossen ist, und das Gehäuse (16) eine Verriegelung (42, 44) aufweist zum im wesentlichen festen Zurückhalten der Kanüle (20) innerhalb des Gehäuses (16), nachdem das Gehäuse in die ausgerichtete Stellung geschwenkt wurde.

2. Spritze nach Anspruch 1, dadurch gekennzeichnet, daß die Spritze (2) ein Schulterteil (10) auf-

weist, welches sich längs vom Hauptkörperbereich (4) erstreckt und eine Verbindung mit dem Gehäuse (16) herstellt.

3. Spritze nach einem der Ansprüche 1 oder 2, dadurch gekennzeichnet, daß das Gehäuse (16) einstückig und über ein Scharnier (14) flexibel mit dem Hauptkörperbereich (4) verbunden ist.

4. Spritze nach einem der voranstehenden Ansprüche, dadurch gekennzeichnet, daß das Gehäuse (16) eine längsverlaufende Hülse mit einem länglichen Schlitz (28) aufweist, welchen die Kanüle (20) passiert, wenn die Hülse in die ausgerichtete Stellung geschwenkt wird.

5. Spritze nach einem der voranstehenden Ansprüche, dadurch gekennzeichnet, daß die Verriegelung mindestens einen Haken (42, 44), einstückig mit dem Gehäuse (16) aufweist, um eine Relativbewegung zwischen der Kanüle (20) und dem Gehäuse (16) im wesentlichen zu verhindern.

6. Spritze (2) nach einem der voranstehenden Ansprüche, dadurch gekennzeichnet, daß die Spritze einen Kragen (56) mit einem inneren Gewinde aufweist, welcher sich von dem Hauptkörperbereich (4) erstreckt und mindestens einen Teil der Hervorstehung (6) umgibt.

7. Spritze nach einem der voranstehenden Ansprüche, dadurch gekennzeichnet, daß das Gehäuse (16) einen Hauptabschnitt, einen Deckelabschnitt (74), einen verformbaren Abschnitt (70) zwischen dem Haupt- und dem Deckelabschnitt und eine Abdichtung (76) innerhalb des Deckelabschnitts (74) aufweist, welche die Spitze (19) der Kanüle (20) abdichtend sichert, nachdem das Gehäuse (16) in die ausgerichtete Position geschwenkt wurde und der Haupt- und Deckelbereich (74) unter Verformung des verformbaren Bereichs (70) aufeinander zugeschoben wurden, wodurch die Spitze (19) der Kanüle (20) in die Abdichtung (76) eindringt.

8. Spritze nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß das Gehäuse (16) flexibel mit dem Hauptkörperbereich (4) über ein verformbares Scharnier (80) verbunden ist und das Gehäuse (16) einen Deckelbereich (74) mit einer Abdichtung (76) aufweist, welche die Spitze (19) der Kanüle (20) abdichtend sichert, nachdem das Gehäuse (16) in die ausgerichtete Stellung geschwenkt und in Richtung der Spritze (2) entlang der Längsachse der Kanüle (20) gedrückt wurde, wobei das verformbare Scharnier (80) verformt wurde und die Spitze (19) der Kanüle (20) in die Abdichtung eindrang.

Revendications

1. Seringue (2) comprenant une partie de corps principale (4) et une saillie (6) s'étendant à partir de celle-ci pour s'adapter à un pavillon (22) d'une aiguille (20), caractérisée en ce que la seringue (2) comporte un capuchon (16) relié de façon flexible et inamovible à la partie principale de corps (4), en ce que l'on peut faire pivoter le capuchon vers une position en alignement substantiel avec l'axe longitudinal de l'aiguille (20) afin d'envelopper l'aiguille, et en ce que le capuchon (16) comprend un verrou (42, 44) destiné à retenir l'aiguille (20) de façon sensiblement fixe à l'intérieur du capuchon (16), une fois le capuchon amené par pivotement en position d'alignement.

2. Seringue selon la revendication 1, caractérisée en ce que la seringue (2) comprend un élément d'épaulement (10) s'étendant à partir de la partie principale de corps (4) afin d'assurer la liaison avec le capuchon (16).

3. Seringue selon la revendication 1 ou 2, caractérisée en ce que le capuchon (16) est relié de façon intégrale et flexible à la partie principale de corps (4) par l'intermédiaire d'une charnière (14).

4. Seringue selon l'une quelconque des revendications précédentes, caractérisée en ce que le capuchon (16) comprend un étui longitudinal comportant une fente allongée (28) à travers laquelle passe l'aiguille (20) lorsque l'étui est amené par pivotement en position d'alignement.

5. Seringue selon l'une quelconque des revendications précédentes, caractérisée en ce que le verrou comprend au moins un crochet (42, 44), formant partie intégrante du capuchon (16), destiné à empêcher sensiblement le mouvement relatif entre l'aiguille (20) et le capuchon (16).

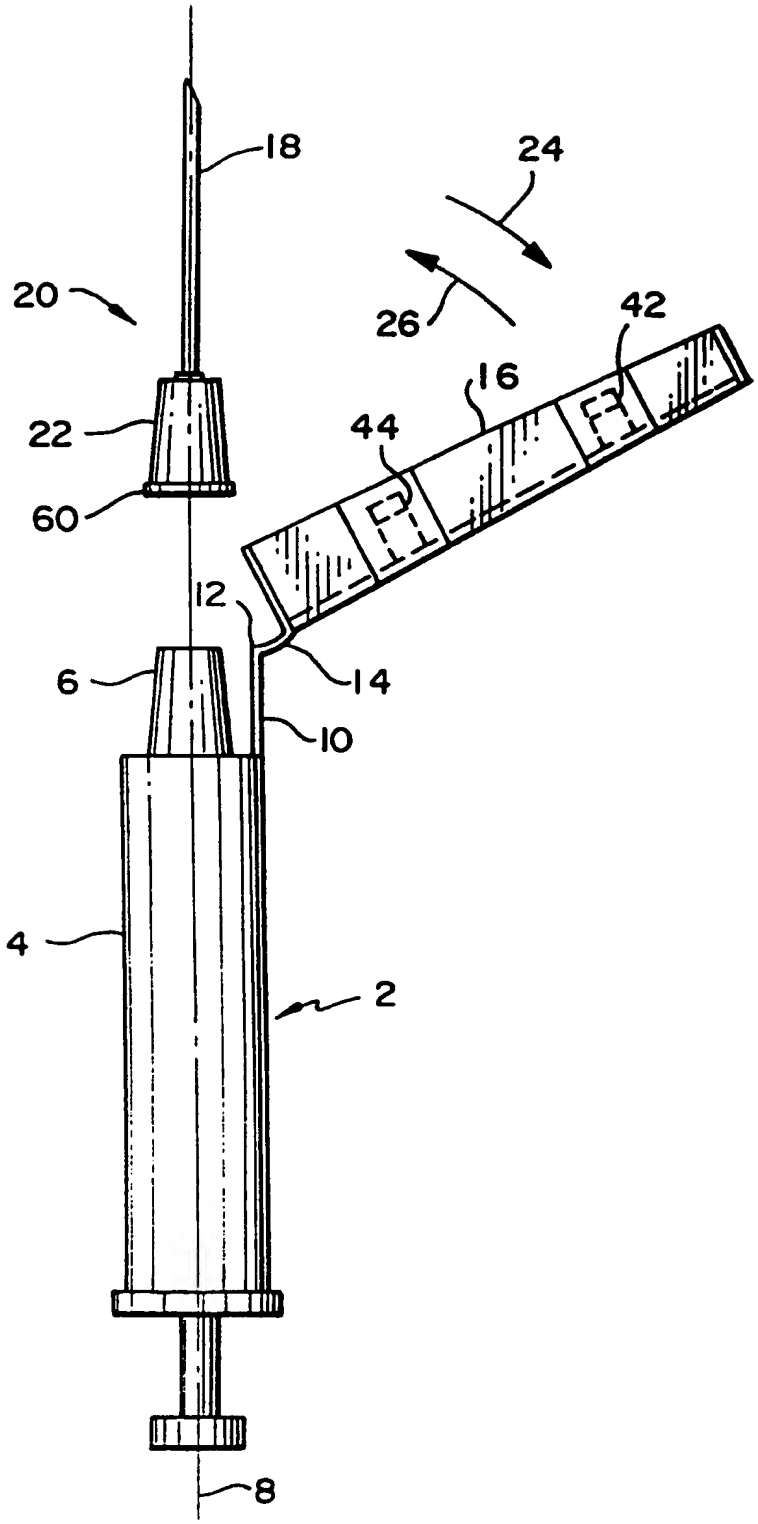
6. Seringue (2) selon l'une quelconque des revendications précédentes, caractérisée en ce que la seringue comporte un col à filetage intérieur (56) s'étendant à partir de la partie principale de corps (4) afin d'entourer une partie au moins de la saillie (6).

7. Seringue selon l'une quelconque des revendications précédentes, caractérisée en ce que le capuchon (16) comprend une partie principale, une partie de chapeau (74), une partie télescopique (70) interposée entre et reliant les parties principale et de chapeau, et un joint (76), à l'intérieur de la partie de chapeau (74), qui saisit de façon hermétique la pointe (19) de l'aiguille (20) après que l'on a fait pivoter le capuchon (16) en position d'alignement et que l'on a poussé de force les parties principale et de

chapeau (74) l'une vers l'autre afin d'écraser la partie télescopique (70), de manière à amener la pointe (19) de l'aiguille (20) à pénétrer dans le joint (76).

8. Seringue selon l'une quelconque des revendications 1 à 6, caractérisée en ce que le capuchon (16) est relié de façon flexible à la partie principale de corps (4) par l'intermédiaire d'une charnière télescopique (80), et en ce que le capuchon (16) comprend une partie de chapeau (74), comportant un joint (76) qui saisit de façon hermétique la pointe (19) de l'aiguille (20), après que l'on a fait pivoter le capuchon (16) en position d'alignement et que l'on a poussé de force le capuchon en direction de la seringue (2) suivant l'axe longitudinal de l'aiguille (20), afin d'écraser la charnière télescopique (80) et d'amener la pointe (19) de l'aiguille (20) à pénétrer dans le joint.

FIG. 1



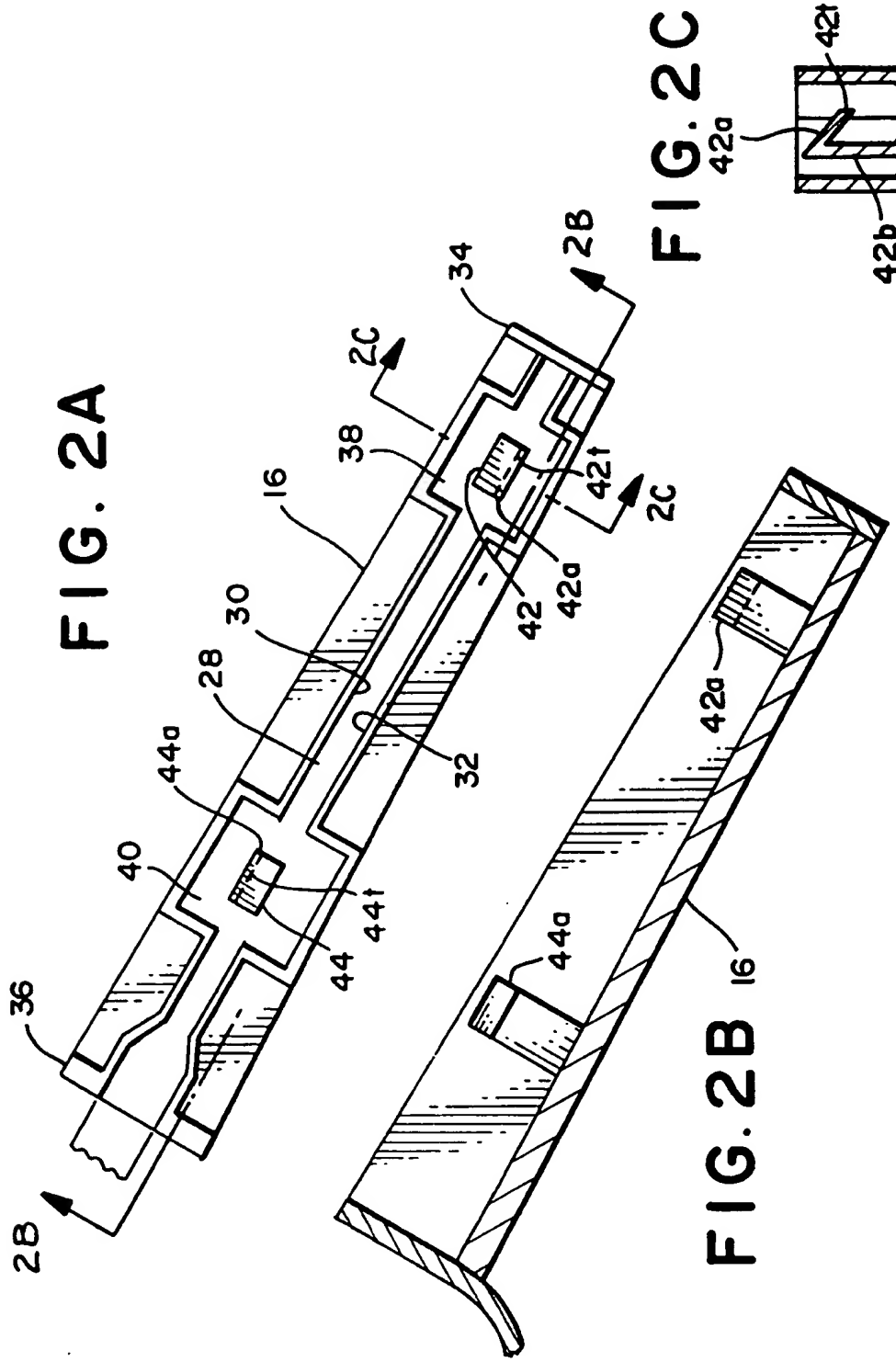


FIG. 2A
FIG. 2B
FIG. 2C
28
36
40
44a
30
28
16
38
34
2C
2B
42
42a
42t
44
44t
32
42b

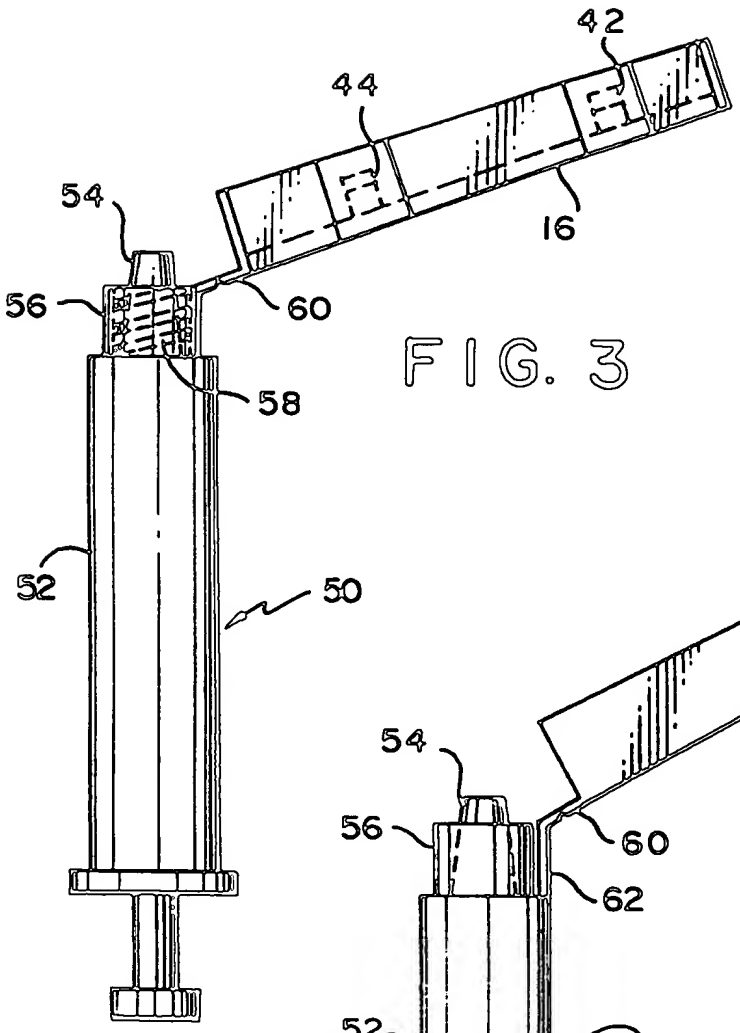


FIG. 3

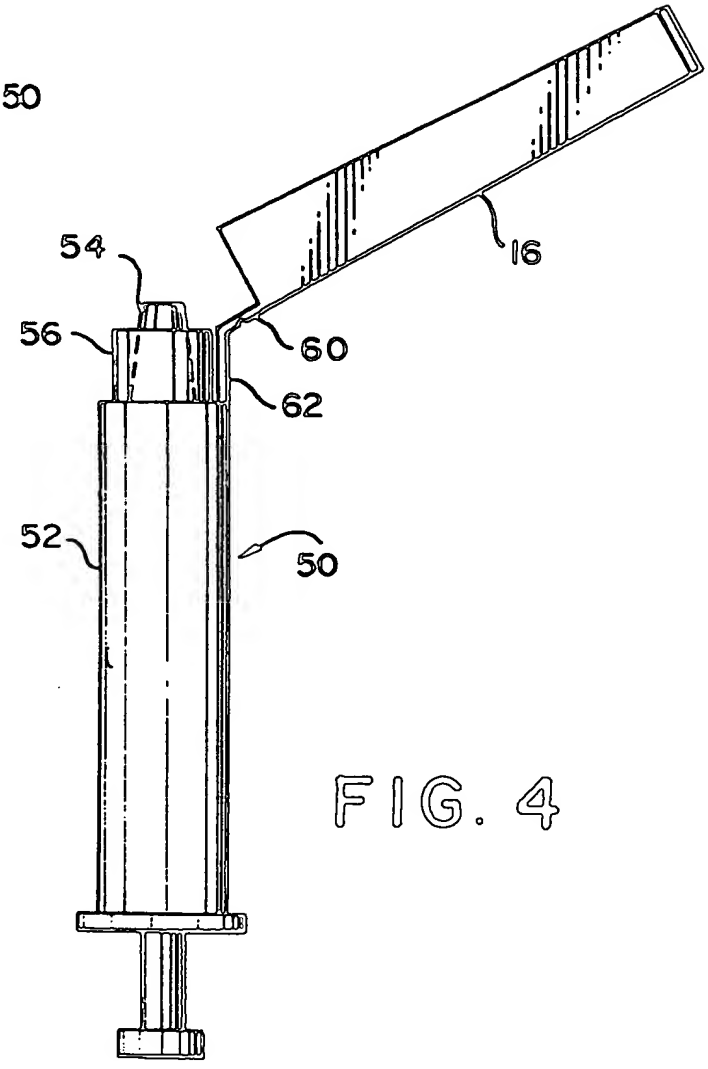


FIG. 4

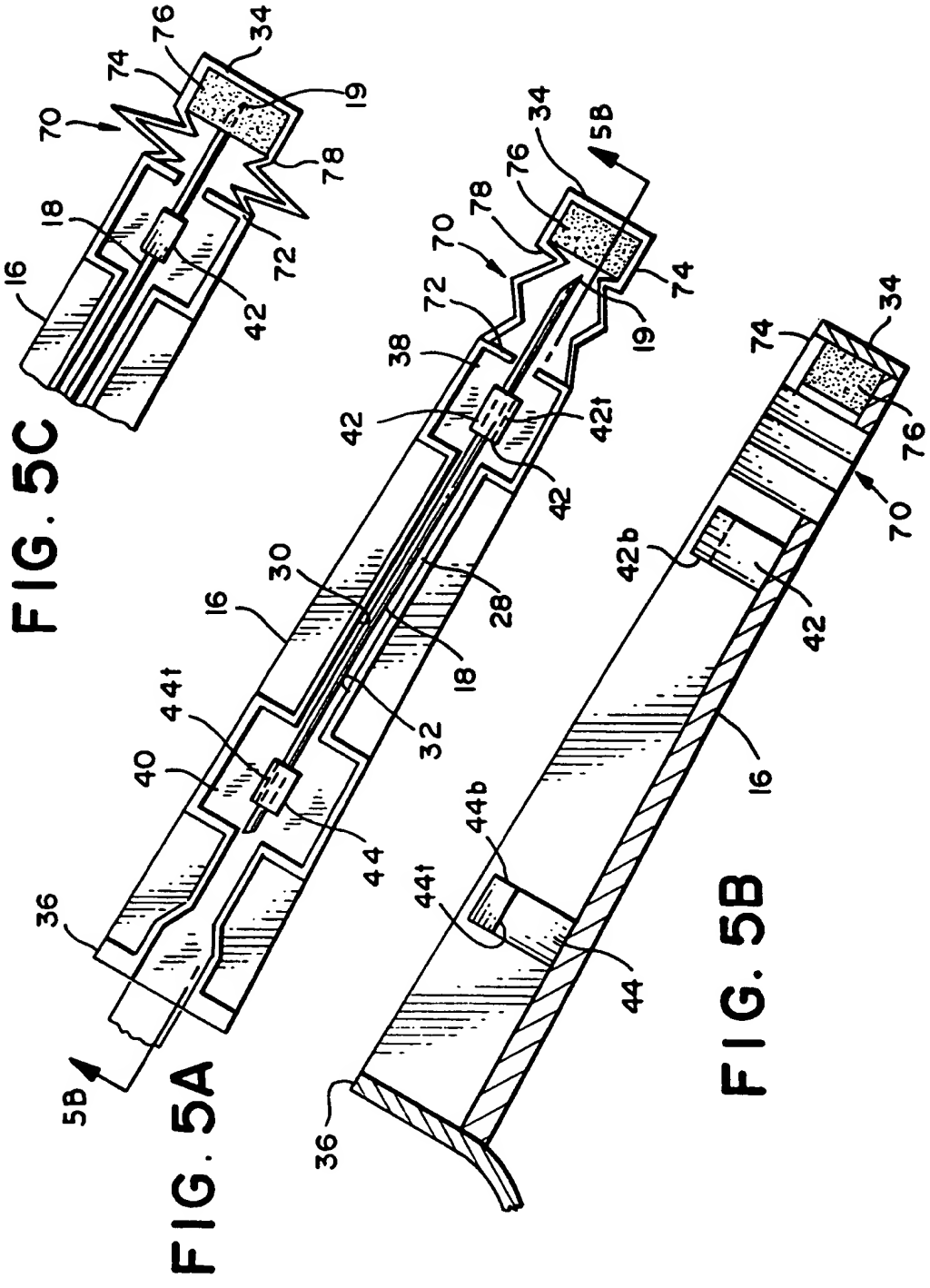


FIG. 5C

FIG. 5A

FIG. 5B

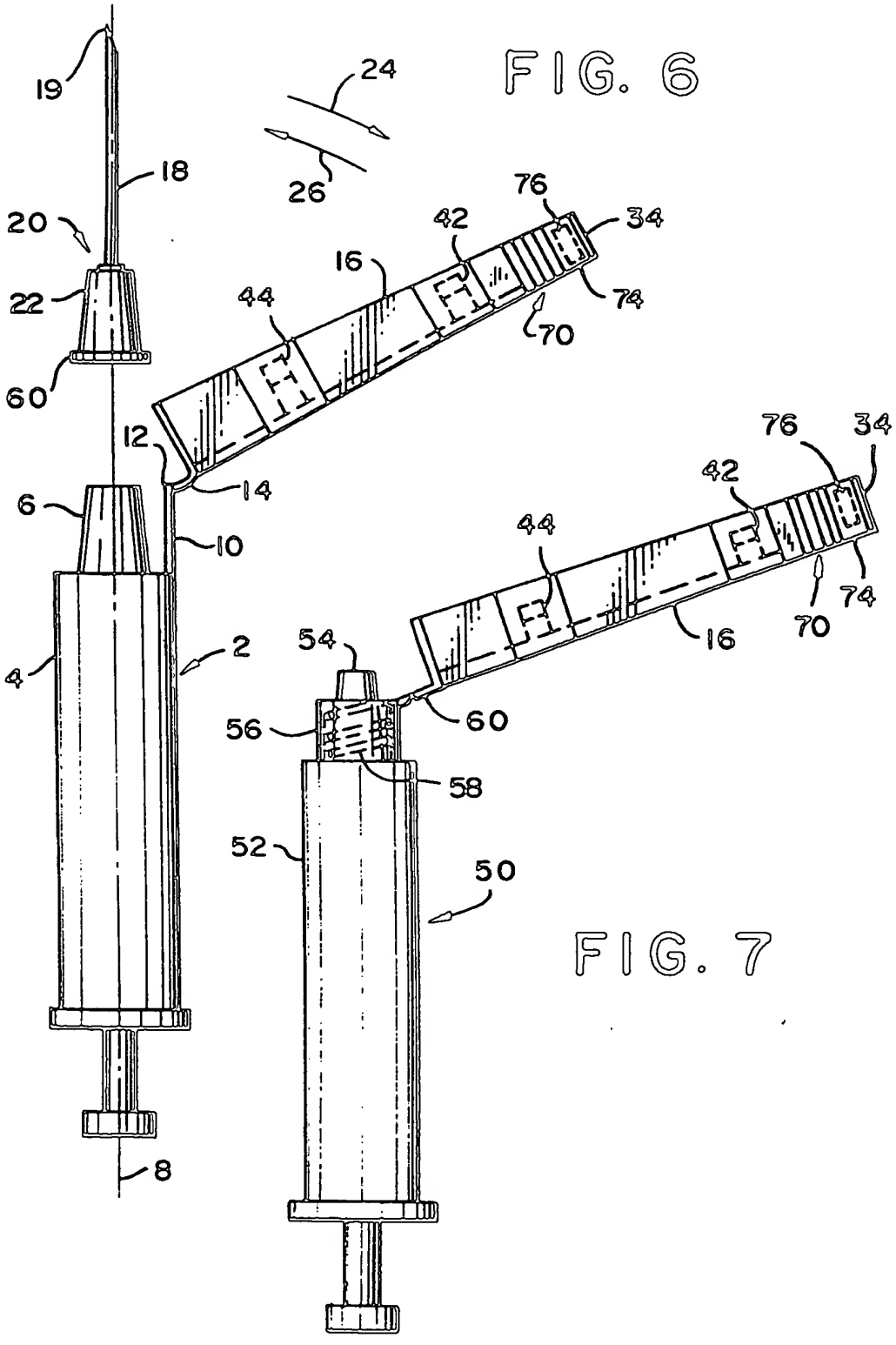


FIG. 6

FIG. 7

FIG. 9

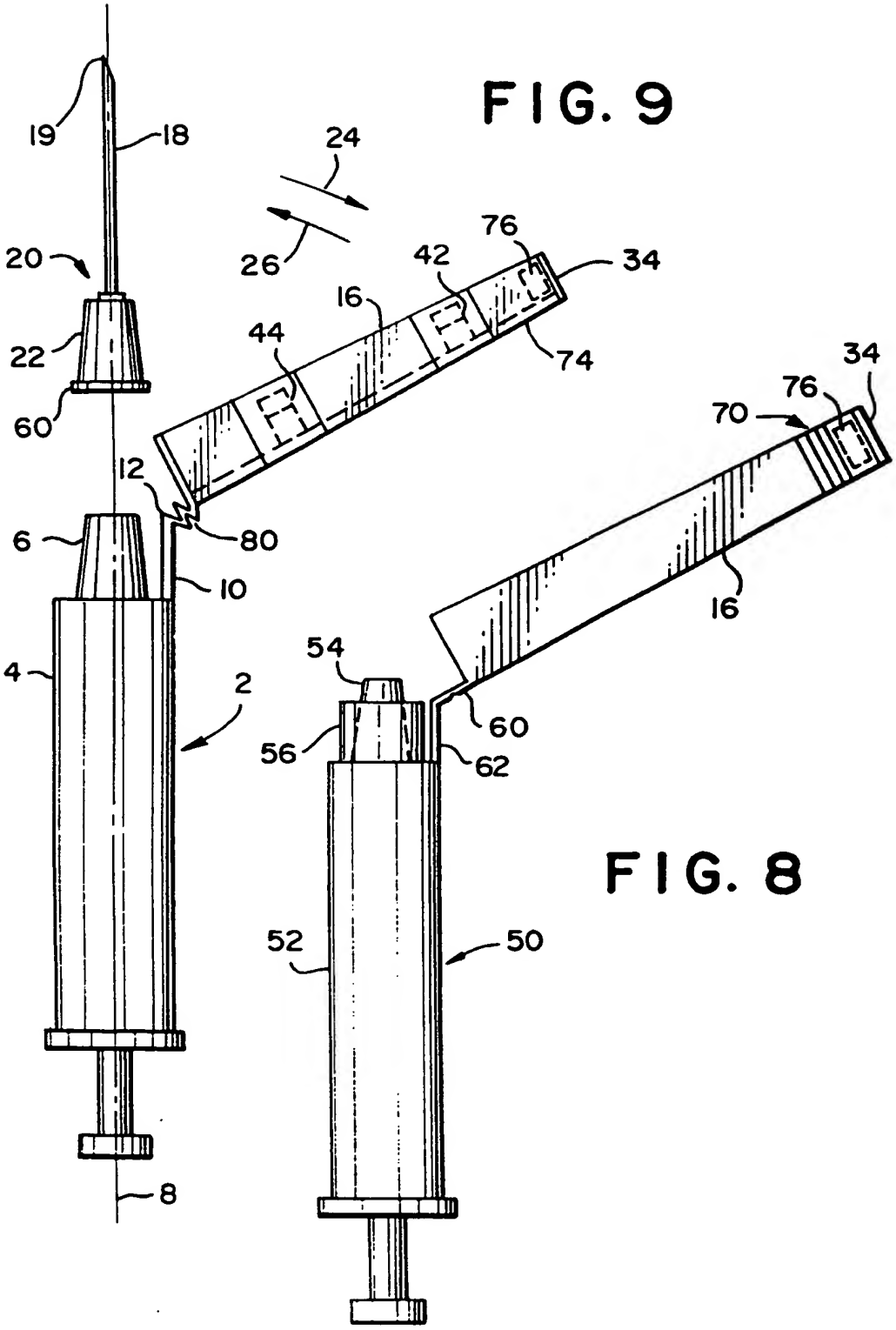

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FIG. 8

FIG. 10

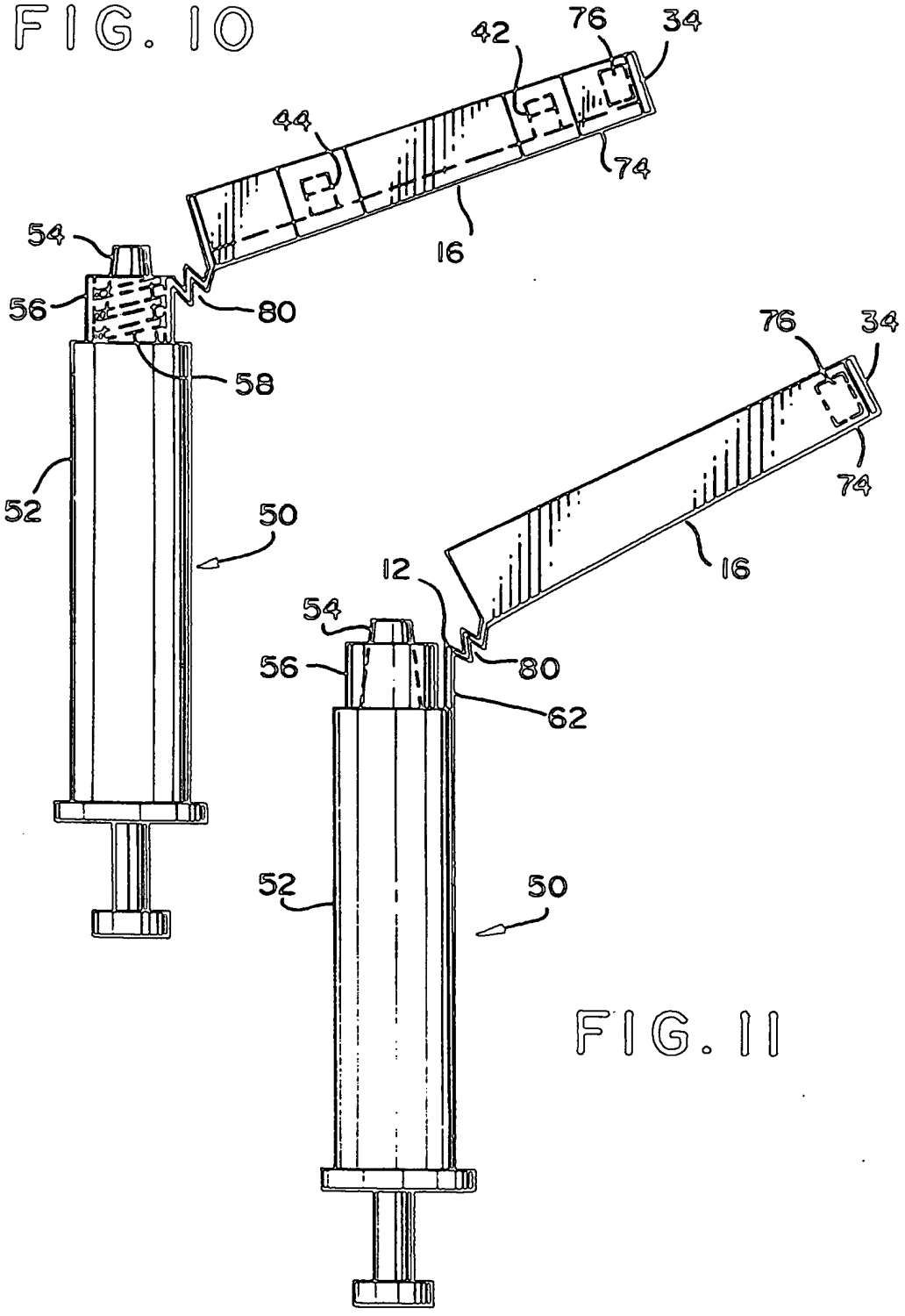

FIG. 11